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PICTURE OF THE MONTH

Convective Clouds Along the Jet Stream

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The Nimbus III satellite, launched by NASA, is providing meteorologists with an operational infrared view of the weather. Local noon and midnight Nimbus DRIR (Direct Readout Infrared) coverage provides the user with more detailed information about the structure of weather systems. In this case, an ESSA 9, AVCS (Advanced Vidicon Camera System) view and a Nimbus III view of a frontal system are discussed.

The afternoon ESSA 9 view, figure 1, shows a solid frontal cloud band stretching from Nova Scotia to North Carolina. Southwest of this area, the frontal band is broken and disorganized. (The ESSA 9 position of the back edge of this front appears in fig. 3.) The axis of the jet stream lies as much as 3° west of this cloud band edge over the Southern States but approaches to within a degree of the edge north of 40° N. A large field of cumulus clouds, which formed in the cold air behind the front, covers a large area from the Great Lakes to Hudson Bay.

The Nimbus III picture, taken 10 hr later at 0529 GMT on October 9, shows the front to extend from Maine to an offshore area east of Maryland. In this photograph (fig. 2), the coldest clouds along the frontal band appear the brightest. Of interest is the bright, rather lumpy character of the back edge of the frontal band. This marks an area of high-level convection located near the jet-stream core. Soundings at Portland, Maine, and JFK Airport, New York, at 0000 GMT indicate that the base of

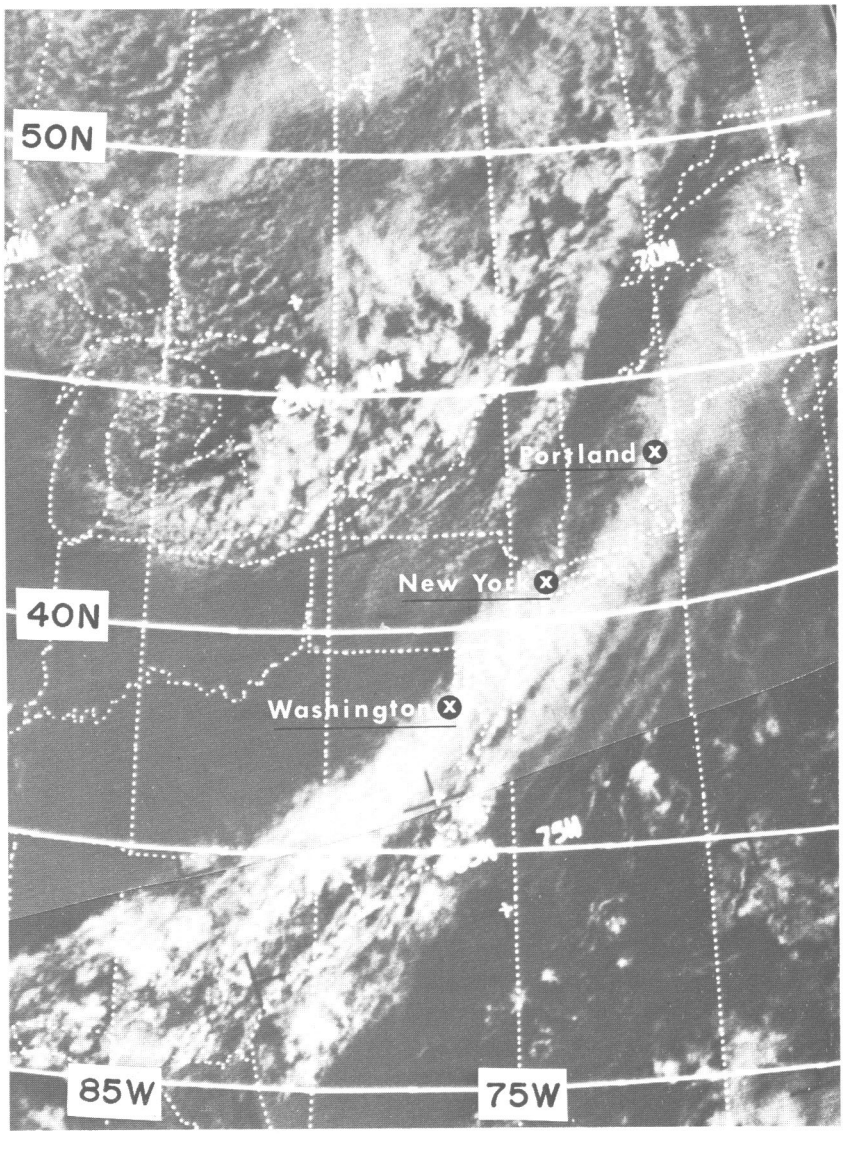

FIGURE 1.—ESSA 9, Pass 2803, at 1857 GMT on Oct. 8, 1969.

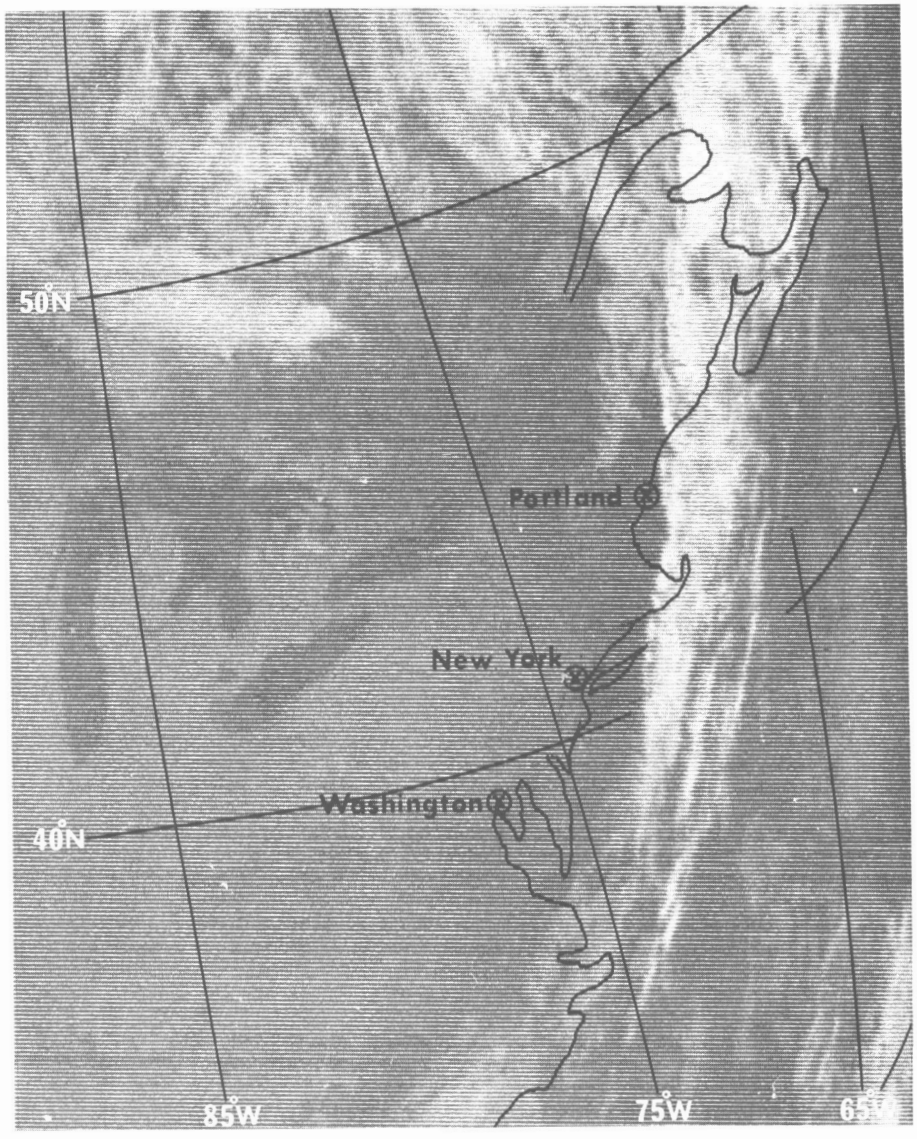

FIGURE 2.—Nimbus III, Pass 2385, at 0529 GMT on Oct. 9, 1969.

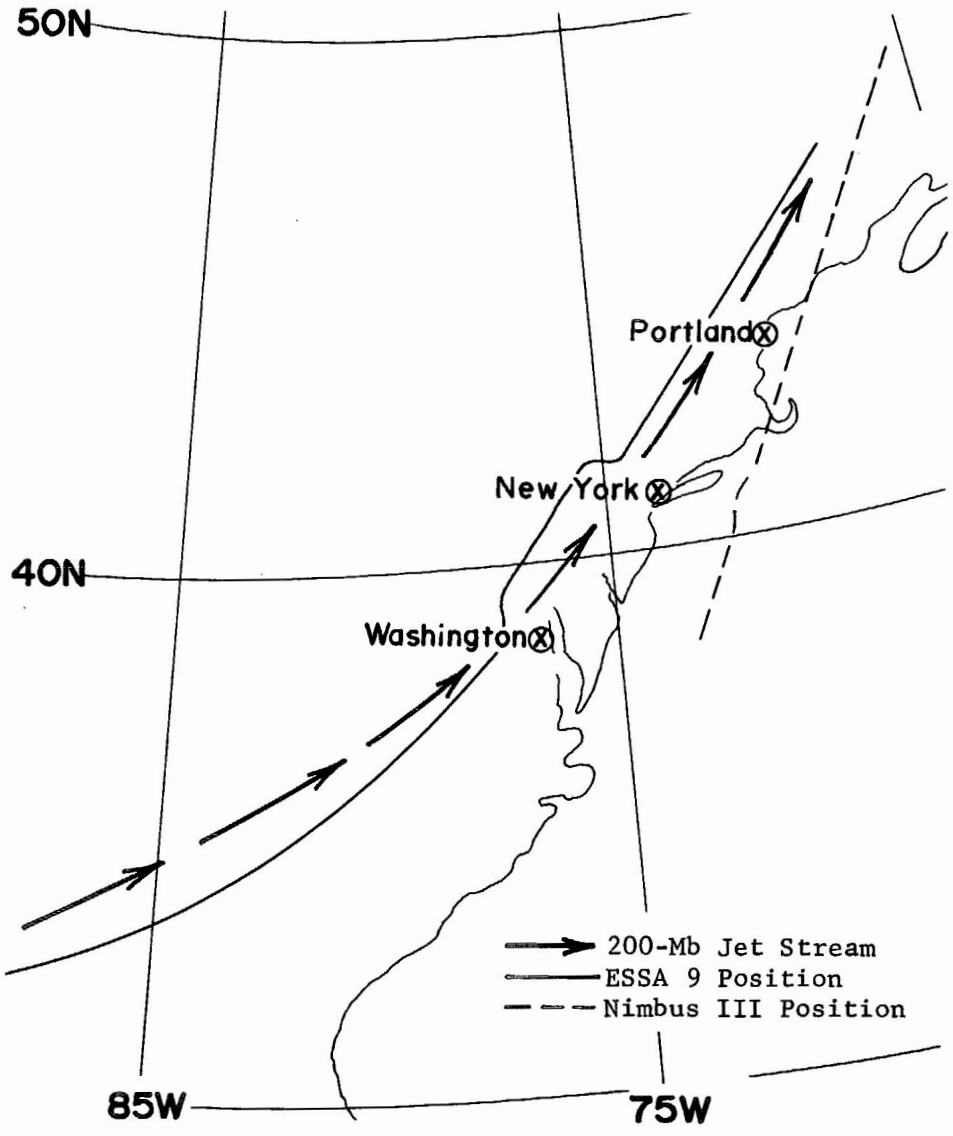

FIGURE 3.—Map showing the 200-mb jet stream position at 0000 GMT and the ESSA 9 and Nimbus III cloud-edge positions.

these upper level clouds is at 400 mb, and the clouds probably extend to 200 mb. As the western edge of this front approached Washington, D.C., mammatus-type clouds were observed within the cloud band. As the front passed the city, ceilings gradually increased, and the cirrus clouds along the back edge of the band were observed to be thick and convective in nature with virga falling from the cloud bases.

Jet-associated cloud shields whose cloud edges appear similar to this one have been frequently observed in the infrared photographs received from Nimbus III.

The cold air cumulus in the vicinity of the Great Lakes, which were visible in figure 1, have dissipated by the time of this Nimbus III pass. The result is an excellent clear-sky view of the warm waters of the Great Lakes and the cooler land area of the eastern United States.